

REVIEW OF REVIEWS

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The statements in previous chapters that deal with the principal sectors of public policy toward environment provide an over-view of the initiatives taken by governmental and private organizations and leaders in the recent past, and an estimate of the impact that these activities have had on the environment as a whole. The object of this appraisal is to judge how far we have come, and to make it easier to discover priorities of goal and strategy in the immediate future.

The principal questions pertinent to a *Review and Appraisal* were outlined in general terms in the Introduction. Mention was made of the goals of public policy, criteria of performance, positive and negative achievements, and optimizing alternatives. The 1970 Conference on "Environment and Society in Transition" under the auspices of the American Division of The World Academy of Art and Science (WAAS) and the American Geographical Society includes a systematic analysis of policy formation, execution and impact. Policy analysis is employed in the present Review of Reviews.

The scope of decision in relation to Environment is indicated in the diagram:

Policy Formation and Execution	Realms of Environment
International	Space and Earth
National	Life
Sub-national	Culture

The most comprehensive generalization about recent public policy toward environment is that *more progress has been made in recent years than at any time in the history of the nation in the formation and execution of policy at every level; international, national, sub-national*. The high point in international action was preparing for and participating in the Stockholm Conference (1972) and its aftermath. At the federal level progress is signaled by landmark legislation (notably the National Environmental Policy Act [NEPA] of 1970). Important legislative and administrative acts took place at the state, metropolitan and local level.

No informed person assumes that the words of a conference resolution, a treaty, a statute or an ordinance are irrefutable indicators of effective public policy toward the Environment or any other subject. At the same time no competent analyst assumes that words are utterly without significance. The phrases of the Stockholm Declaration, of NEPA, or the Supreme Court in the Calvert Cliffs case did not appear in a vacuum. They were incidents in a torrential stream of acts, both private and public that crystallized expectations about authoritative and effective norms of public policy.

If we look past the words and deeds involved in formulating and endeavouring to execute environmental policy, and attempt to assess their impact on environment, we can point to some positive consequences. The atmosphere is partly protected from the fumes of automobiles, and of industrial and residential heating plants. Some triumphs have occurred in the cleansing of inland water and in promoting decisions that successfully blocked or deferred programs whose results would have accelerated environmental deterioration.

We must also acknowledge that some results have been negative. Some price rises and failures of service are laid at the door of legal or administrative ambiguity and delay.

Viewing the scene as a whole we conclude that *a wide gap separates the long term goals outlined at the Conference of 1970 and the present state of the environment*. Consider, as one example, the basic concept of recycling and the fragmented stage of present knowledge and performance.

A pre-condition of more effective future action is that we become more aware of and concerned with improving the policy process as a whole. We therefore analyze the Reviews and Appraisals presented in the preceding pages for the glimpses that they give of the ups and downs of the decision process as it relates to Environment. Schematically:

The Policy Process toward Environment (Official, Private)

Prescription

(1)

Invocation

(2)

Application

(3)

Termination

(4)

Appraisal

(5)

Intelligence

(6)

Promotion

(7)

1. *Prescription.* Crystallizing expectations about the authoritative and controlling norms of environmental policy. Indicators include: treaties, statutes.

2. *Invocation.* The provisional characterization of concrete circumstances in terms of conformity or non-conformity to prescriptions. Indicators include: initiation of administrative acts of conformity to prescription; private initiatives toward conformance; policing, protest, prosecution.

3. *Application.* The continuing and final characterization of concrete circumstances in reference to prescription. Indicators include: final administrative and judicial decisions; employment of sanctions to reward or punish.

4. *Termination.* Cancelling a prescription and adjusting the claims of those who suffer deprivation as a result of changed public policy. Indicators include: repeal of legislation or denunciation of treaties; compensation to those who have relied on past public policy; equivalent facilities for persons forced to move their residences from dangerous flatlands; obsolescence of public and private norms in practice.

5. *Appraisal.* The characterization of policy operations as compatible or incompatible with policy objectives, and the attribution of responsibility. Indicators include: reports of legislative or administrative commissions of inquiry into levels of performance of public policy; evaluation of performance by private commissions and individuals.

6. *Intelligence.* The clarification of future goals and alternatives of policy in the light of historical trends, scientific conditions and estimated future developments. Indicators include: recommendations of governmental and private planning commissions; comparison of benefits, costs and risks of alternative policies; forecasts of the future; factual surveys of relevant past and present changes; research on factors conditioning environment.

7. *Promotion.* The use of advocacy (or other forms of pressure) to affect the policy process. Indicators include: political party and pressure group declarations; campaigns to mobilize support for declarations and other commitments.

Since every component of the decision process interacts with every other, the arrows in Diagram 2 could be extended to connect each phase with every other. For many purposes it is convenient to distinguish two categories of decision outcomes: *constitutive*; *other public order decisions*. The constitutive outcomes allocate authority and control to offices and agencies. The other public order decisions are made by constituted authority. The decision process is a continuing interaction between the official structures of government and the cultural, biological and physical context. If we think of decision as the authoritative and controlling outcomes, the ultimate analytic task is to relate these outcomes to pre- and post-outcome events, especially those affecting environment.

INTERNATIONAL PRESCRIPTIONS

The 113 governments at Stockholm, including the U. S. A., agreed to three interrelated documents of great immediate and potential importance for the formation of authoritative and controlling norms of public order in the world community. The norms range from high level abstractions about goals to

instrumental norms. The 26 principles of the Declaration on the Human Environment are "to inspire and guide the peoples of the world in the preservation and enhancement of the human environment." The Action Plan consists of 109 recommendations for action at the international level relating to Human Settlements, the Management of Natural Resources, and the Identification and Control of Pollutants. At the 1972 session of the U. N. Assembly most of the proposals of the Stockholm Conference were accepted.

The Conference resolutions can be usefully examined in the perspective of the traditional public order of the Environment. These legal and organizational arrangements are much richer than is ordinarily recognized. Three sets of principles of content can be distinguished:

1. *The Allocation of Resources.* a. Some resources are subject to exclusive appropriation by a nation state: The land mass, internal waters, territorial sea, superjacent airspace, continental shelf. b. Some resources admit of inclusive enjoyment: "shareable resources," which include the oceans, the airspace above the oceans, and the ocean floor; the void of space and celestial bodies; international rivers; polar areas; flow resources (renewable); stock resources (non-renewable).

2. *The Regulation of Employment in Use.* a. Various restrictions on injurious employment in use; b. Norms to facilitate productive and harmonious employment of resources.

3. *Access and Right to Enjoyment.* a. Control over nationality, movement and numbers of people; b. Universal human rights.

It is generally recognized that Principle 21 of the Stockholm Declaration deals most fundamentally with the regulation of use.

"States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction."

The basic ambiguities in this Principle accurately reflect the contradictions and uncertainties characteristic of the "incompleteness" of the world public order of today, perpetuating as it does the supreme control by nation states of their own affairs as modified by duties to refrain from harming others. The implied and well-understood situation is that the recognized procedures by which nation states may act to protect themselves from others, in case of unresolvable conflict, run the gamut from diplomatic persuasion, through acquiescence in various degrees of third party mediation, to the use of organized violence in full-scale war.

The National System

The National Environmental Policy Act (1970) or NEPA is the major step toward providing a comprehensive system of prescriptions to provide an authoritative and controlling system of goals and instruments for U. S. policy. A federal system gains strength from the fact that early and local loyalties, demands and expectations are fused in a set of arrangements that allow

changes to occur piecemeal until the time arrives when the importance of collective action is generally acknowledged. When this plateau has been reached unified policy can develop rapidly, and new agencies can take the lead in formulating and executing the details. NEPA signified the new level of nationally tolerable action whose features are visible throughout this *Review and Appraisal*.

In 1972 the legislatures of more than half of the 50 states approved measures to deal with environmental problems. Unlike the situation in previous years when many environmental bills were filed and given little attention, far more initiatives were passed than were defeated. Evidently the "symbolic" stage of concern for public policy toward environment has been succeeded by realistic commitment.

Prescriptions governing land use were the most numerous and widely dispersed among the states. Controls were imposed on subdivisions, wetlands, natural areas and strip mining. A dozen states enacted new laws on air and water pollution. Another area of activity was the establishing of new administrative machinery to cope with environmental problems. Kentucky and Ohio, for instance, set up new state departments of environmental protection, superseding citizen pollution control boards. The Kentucky department received jurisdiction covering air, water, solid waste, noise, radiation and strip mining. In many states positions on pollution control boards are assigned to special-interest groups. Significantly, Missouri now requires that a majority of the membership of its boards must be representative of the general public. Hawaii is the first state to make an approach to "automotive birth control". An interdepartmental commission is to make annual recommendations for limits on the number of cars on each of the state's islands.

In addition to other prescriptions designed to affect the physical or biological environment, several aspects of the cultural environment are objects of attention. Colorado established a population advisory commission to consider long-range growth policies.

*U. S. Policies Toward Various Shareable Resources:
Marine Life, Seabed, Polar Regions*

In dealing with some sectors of the Environment U.S. policy is conspicuously bound to the policies of other nation states. One of the best-established norms in international law is in process of revision as a result of the dramatic changes that have taken place in the world fishing industry since the end of World War II. Fishing fleets usually have the technical capacity to fish almost anywhere in the world. World fish production, however, shows signs of slower growth or levelling off. U.S. domestic production has declined while the market itself has expanded. The U.S. fishing industry is under tremendous pressure from increased foreign fishing in waters adjacent to the U.S. coast. The official position of the U.S. government has been that fishery resources outside of a three mile territorial sea (more recently a twelve-mile zone) should be regulated on the basis of recommendations of international commissions made up of countries interested in the resources, and that the objective of the regulation should be "maximum sustainable yield."

A Law of the Sea Conference is scheduled to be held in the near future. The U.S. Government has considerably modified its initial position and now has the support of most of its domestic fishing interests. A key change is to base management of fish resources on biological characteristics (species and stocks) rather than zones. The coastal state would have responsibility for regulation and enforcement of its coastal resources and the preferential right to reserve to its flag vessels that portion of the reserve they could harvest. Highly migratory species would be managed by international commissions much as at present. International standards are to be set, including arrangements for obligatory settlement of disputes.

Another sector of the environment that is the object of significant challenge to long-standing prescriptions of the international legal order is the seabed. Traditional international law recognized a coastal nation's jurisdiction over the seabed to include its territorial sea. In 1945 the U.S. government claimed ownership of all seabed resources on its adjacent continental shelf. The resulting spate of claims to varying degrees of control led the U.S. government in 1970 to attempt to stem the tide by calling on all nations to renounce their claim to resources beyond the point where the high seas reach a depth of 200 meters and to establish an international regime for the exploitation of resources beyond this limit. It was also proposed that the resources of an "intermediate zone" be administered as a trustee of the international community by the coastal state. Whatever the International Law of the Sea Conference decides, it should be noted that the older "freedom of the seas" conception has undergone some attrition. This is arousing varying degrees of general concern in view of the importance of the doctrine and its implementation for world public order. "Freedom of the Seas" meant that the high seas (including the seabed) was a pool of resources held in common by and for all mankind. The norms established in relation to the seas was ready for extension to outer space, and today we think of the resources of outer space as part of the patrimony of us all.

The polar regions are particularly interesting as cases of international action to prevent military competition among the powers, and to encourage research and programs of resource utilization. The Antarctic Treaty laid a firm foundation for later developments.

*Toward Further Integration of Fragmented Goals:
Land Use, Energy, Population and Culture*

A long history of U.S. public policy toward different uses of the land has led to the present situation of contradiction, confusion and partial clarity of goal and instrument. For instance, public policy toward forests and timber processing has reached a level of complexity that *urgently calls for codification as part of a comprehensive land use program* such as Congress appears to be moving toward. Adequate legislation would provide the basis for regulating the use of forest lands, as well as focusing on critical areas such as wetlands, highway interchanges, and rapidly developing localities. Funds would be provided for land use planning and regulation by the states.

It is useful to bear in mind the land use distinction made in some European

countries between the intensive and extensively managed forests. The intensively managed forests are considered a monoculture designed to maximize the yield of timber or fiber. The extensively managed forests are under a multiple use system where the forest is managed as a community. Timber is harvested on much of the land, but major consideration is likewise given to wildlife, watershed protection, recreation and aesthetic values. In North America the goal of timber maximization has tended to carry monoculture and intensive management "beyond the returns expected from the site."

The energy field is a critical area where a *national commission mechanism may be necessary to bring order into the overlapping goals affecting public policy*. Jordan and his associates who consider public policy toward fossil energy underscore the point that "the basic goal of current public policy should be the pursuit of integrating trends and comprehensiveness in legislation, and also the introduction of corrections to remove imbalances, inefficiencies, and inequities imposed on our industries." They cite with approval Senate Resolution 45 of 1970 which calls for a study of fuel and energy requirements and an effort to "simplify, coordinate, and provide effective and reasonable national policy."

Although goals may be modified in the future it is wise to assume "a steady increasing energy supply of a few percent per year" as an essential objective. Reserves of coal, oil and gas are ample. The present "shortage" is a result of economic factors related to several influences, one of which is environmental protection costs. In oil and mining about 6% of total capital expenditures (1970) were environmental protection measures. These costs will continue until the eventual substitution of alternative energy sources.

Any comprehensive and authoritative prescription of energy goals and principles should include a summation of the fundamental significance of energy in the equation that links *man, energy and resources*. In per capita terms the high-energy economies of the globe consume *more than fifty times* the industrial energy available in low-energy countries. There are grounds for emphasizing the role that atomic energy can play as successive generations of reactors introduce cheaper and safer means of obtaining energy at the rate required to meet the probable public and private demands of our society.

Given the critical importance of energy the evaluation of public policies must embrace a wide range of conventional and unconventional options for the future. It is to be recalled that it has not been unusual for underdeveloped sources of energy to be accelerated with the aid of massive infusions of public investment when the prospects are that the costs of industrial and non-industrial uses can be reduced, or shortages can be prevented. This was the history of hydro-electric power in many regions, and of the early adaptation of atomic energy to military uses. The full potential of the atomic source for all purposes may depend on a scale of investment that is feasible when the governmental channel is given priority for an extended period.

It is no surprise to find that national goals toward the several sectors in the complex realm of culture are unsatisfactorily integrated. The Reviewers

propose *national commissions to take advantage of the public concern and scientific knowledge presently available in fields such as Education, Population, Health and Family*. The proposed program on Population, Health and Family problems is an especially comprehensive fusion of functions and will be considered later. (5.b).

U.S. commitment to education is so great that "education is more available today to the public than in any other country in the world." By 1970 the percent of 18-year olds who graduated from high school reached 78%, of whom 60% went to college. By 1980 the corresponding figures will probably be 89 and 65%.

The goals for education have been changing until, for instance, "American higher education has become the indispensable instrument of a technocratic society governed by a professional meritocracy." The recent move toward open admission of institutions of higher education for everybody emphasizes the timeliness of developing a public policy that recognizes the importance of maintaining some establishments devoted to the preparation of highly specialized and creative scholars.

In response to pressure throughout the nation the federal government from 1963 to 1968 passed more legislation affecting education than at any time in history. The Education Amendments of 1972 "establish public policy toward higher education and controls by the federal government of a scope never previously encompassed by legislation."

This legislation is a direct response to the growing financial crunch affecting private and public education. Private education is already in deep trouble. In 1950 the student split between public and private was 50-50. By 1970 it was 73-27. All systems are under pressure to cut the costs of an acceptable education. At the same time educators are demanding that a larger fraction of the gross national product be allocated to education. So urgent and various are the issues involved that Eurich and his associates propose "a national commission on public policy toward education to be appointed by the President or the Department of Health, Education and Welfare." Drastic new options ought to be explored, such as the use of television and computers on a national basis for instructional purposes.

As educational organizations increase their scale of operation many counter-pressures are generated on behalf of local and pluralistic interests. New universities, for example, are utilizing the multiple-college format, and metropolitan systems of instruction are devolving authority to localities. The optimum mix of structures is not yet agreed upon.

If we accept the view that education is continuous from birth to death, many changes in objective and method are implied. It must be understood that "years of schooling have little relationship to achievement" and that most education is received outside formal classrooms. Education becomes a way of life that adapts itself to realizing the full potential of individual growth.

INVOCATION

It is little exaggeration to say that the National Environmental Policy Act

released a *blitzkrieg* of demands for prompt action that affected administrative and judicial structures at every level of jurisdiction. The results were sometimes dramatic and remain controversial. Even those who deplore some consequences of the *blitz* concede that specific campaigns were essential to take advantage of a situation that contained remarkably favorable elements of public support for environmental action that would go "beyond words" to effective impacts.

The situation in Alaska has dramatically altered since the first major oil strike in July, 1957, and the admission to statehood in 1959. The new state obtained title to its offshore lands (in the three-mile limit) by virtue of the Submerged Lands Act of 1953. The North American Arctic contains billions of barrels of recoverable oil, and the scale of development cannot fail to affect the environment adversely unless adequate plans are made in advance. One of the most bitter conflicts that has yet arisen between arctic-resource development and environmental protection was generated by the plan to construct a hot-oil pipeline, 800 miles long and 48 inches in diameter from the Prudhoe Bay region of Northern Alaska to the ice-free Pacific Coast port of Valdez. The Interior Department did not promptly issue a permit. Instead it conducted an exhaustive investigation as required by the Environmental Policy Act (1970).

The importance of marshes and estuaries is indicated by the fact that no less than two-thirds of the world's entire fisheries harvest spends an essential part of its life cycle in estuarine wetlands or is dependent on species that do." At many places the cities are the source of floods of sewage and of other consequences that endanger the environment. The best known cases in which conflicting interests were directly involved were the Florida barge canal and the Calvert Cliffs nuclear power plant. The President took the advice of his new Council on Environmental Quality and stopped the barge project even though 180 million dollars had already been spent. Calvert Cliffs is the site of a nuclear power plant being built in Chesapeake Bay. The U.S. Circuit Court for the District of Columbia ruled in 1971 that the Atomic Energy Commission had seriously lagged in carrying out the intent of the National Environment Policy Act, and forced reconsideration and delay.

In regard to sound pollution a notable victory was the defeat of further funding for the SST.

Vigorous action was necessary to mobilize the money and the skill necessary to initiate effective pressure on government. Hundreds of initiatives were taken over the nation, especially by civic associations having a long or a recent record of involvement with policy toward environment.

One noteworthy development is the activity of "public interest" lawyers, law school teachers and students. For many years the lawyers have been conspicuously missing from the ranks of those touching the Environment, with one noteworthy exception: they were prominent in the defense of corporate clients. There was no significant "environmental bar", no courses and programs, treatises, case books or journals to speak of. Despite the obvious interdisciplinary relevance of law, engineering and many related sciences and

technologies, there were few joint programs in schools of law or engineering, or in universities. About 1965 a wave of concern showed itself in many academic institutions and professional associations. Ralph Nader's initiative against the practices of the automotive industry provided a model of leadership that was widely emulated. At last the latent resources of the legal system were examined with new purpose and intensity.

The importance of joint action among lawyers, engineers, and other scientists has been exemplified in any number of cases. A well-known limitation in the enforcement of environmental protection measures has been the failure of engineer-administrators to keep the kinds of records that are essential "evidence" in successful litigation.

APPLICATION: DIFFERENTIATION OF STRUCTURES AND ASSETS

An analysis of the Reviews appearing in this book shows that *great differences are to be found in the degree of clarity that has been attained in the major sectors of environmental policy. The degree of clarity is usually connected with the presence of a specialized administrative structure* that is under continuing pressure to explain and justify what it is doing, and to propose or accede to policy prescriptions that provide guidelines of choice.

It was with such considerations in mind that the Stockholm Conference put forward a detailed proposal to set up continuing institutions to put the Action Plan into motion. At the 1972 meeting of the U.N. Assembly the principal recommendations were accepted and the first steps taken toward an agency with specialized responsibility in the environmental field. Centers are authorized outside New York in the hope of mobilizing and keeping alive more favorable attitudes in developing countries than prevail today.

NEPA provided for a responsible agency of application. No doubt in the hope of avoiding too much immediate centralization of decision a heavy burden was also laid on other regulatory structures.

Seaborg and his colleagues draw attention to several unsatisfactory features of federal regulatory processes in the interest of health and safety, service and environmental quality. Under the National Environmental Policy Act an agency such as the Atomic Energy Commission must assume responsibility for total environmental impact as well as for nuclear safety. However, "if we force existing specialized regulatory authorities to become enmeshed in control efforts of widening responsibility and increasing complexity, the result may simply be reduced efficiency and dilution of their primary responsibility." The present NEPA criteria that guide the Atomic Energy Commission, for instance, are criticized as at once "too broad and too narrow." The catalogue of issues is too broad to be competently solved. The requirement that the specific project under license is to be the center of analysis is too narrow.

We have mentioned the sudden and extraordinary burden that was thrown on the courts and other official agencies as an aftermath of NEPA and other legislative prescriptions. The new policy toward environment emphasizes the *aggregate* impact of single and parallel policies. The traditional approach has been to proceed from case to case, and to narrow the examination of aggre-

gate issues. The new emphasis is on assessing the *future* rather than waiting until deterioration has occurred and can become an object of retrospective investigation. The older approach was, in effect, to free the individual unit from responsibility for the "external" costs to society of negative environmental consequences. The innovative emphasis is to "*internalize*" costs by utilizing an array of negative sanctions and positive inducements. Above all in significance is the *procedural* requirement of advance estimates to be made in a public decision making arena.

It is generally admitted that the National Environmental Policy Act, though resulting in many beneficial innovations, has also delayed offshore pipeline construction and lease sales. Expertness is needed in drafting environmental impact statements for approval; and the courts need to separate valid challenges from "disruptive accusations that have only nuisance value." It is probable that more specialized structures are needed to focus expertness and concern on environmental problems. It may be useful to deal with noise pollution through environmental protection agencies rather than through structures whose main responsibility is to cope with other problems such as transportation or navigation. "Environmental police" can be trained to evaluate noise infractions on the spot and empowered to issue summonses. General purpose enforcement officers are notoriously lax in dealing with noisy recreational vehicles.

Strategies will undoubtedly change in the light of experience with every category of environmental action. We have referred to strategies of *deterrence* that deal promptly with many acts of non-compliance, perhaps mobilizing community authority to intervene before further deprivations are inflicted. Several strategies of *prevention* have been mentioned. (Also *reconstruction, restoration*).

Coordination: Governmental and Private

Some policies toward environment put an exceptional strain on the several components of the governmental system as a whole. The internal problems involve structures at the *federal, state, local and municipal levels, and require close articulation between prescription and application. Often the key issue is how to obtain largely voluntary coordination on the part of private interests.*

These issues are nowhere better exemplified than in the policies pertinent to the "static and dynamic structures" of the environment. In many ways the most conspicuous impairments of the environment are by man-made buildings and transportation facilities. A confusing mass of governmental and private practices must be more effectively coordinated in the future than in the past if the appropriate goals are to be clarified and actualized.

The demand for cheap housing has recently culminated in "operation breakthrough", a federally financed and sponsored program to smash through the innumerable restrictions that have prevented private industry from meeting the situation. Feld reports that multi-family public low rental housing has seldom, if ever, advanced the neighborhood. And this is the field in which pre-fabrication and assembly have the greatest potential, which have been coupled with environmental deterioration.

The National Corporation for Housing Partnerships is providing incentive for private corporations to invest in housing development. Tighter controls on long term investment protection will result in construction having less deleterious effects on the environment in the future.

Feld points out that the life of a shelter structure depends on whether the rental roll still shows a profit or the vacant land value is worth more than the building. *Government can insist on demolition and removal of all shelter that has been allowed to drop below a reasonable standard.*

Condominium ownership seems to keep buildings in better shape than rentals. The practice can be extended from residential to commercial use.

The total situation can be greatly improved if governments in every jurisdiction examine their own practices and change them to conform to such enlightened policy principles as the one stated above. Some progress is being made. Instead of monumental edifices the trend for several years has been for government agencies to lease office space with maintenance and control of aging the responsibility of the owner. The notorious blight of the temporary office building is on the way out. However, some government structures, like schools, "tend to live forever, or until they burn or collapse". It seems reasonable that *school budgets should include annual contribution to a revolving fund for replacement*, which properly administered could eliminate the great discrepancy in facilities.

Bridges and dams are not yet subject to *routine inspection, repair or replacement* despite the occasional failures that dramatize the need.

The mechanism of the "authority" has been chartered in many jurisdictions to expedite the construction and use of facilities for mobility. "Good design, maintenance and environmental protection" are usual.

There is growing awareness of the disadvantages connected with the use of 15% or more of an incorporated land area for expressways. Evidently double decking and air right development over traffic arteries are becoming essential.

Apparently the time has come to challenge the principle of segregated use of structures. Mixed uses are appropriate to high risers, such as commercial and light industry on the lower floors, with apartments and offices on the upper levels.

It is suggested that zoning regulations need drastic revision in order to reverse the outward scatter of urban populations. *Land is a fixed asset and use must be planned to meet diverse requirements.* "Giving priority to one use, whether building or park, at the expense of other necessary uses is a waste." Lack of proper maintenance together with vandalism can wipe out any program for full use of available land and protection of the environment.

If governments in every jurisdiction examine their own practices in the domain of atmospheric and sound control, they will find many ways of inducing as well as threatening compliance with sound policy goals.

A strong incentive for the elimination of noise would be *the revision of standards for government purchases* of jet aircraft, trucks, tanks, buses, loco-

motives, power mowers, etc. The government ought also to cut noise on its own construction projects.

Anti-noise measures are in a chaotic state chiefly characterized by "stop-gap measures" and undifferentiated administration. Control can be applied at the point of origin, transmission or reception of noise. The measures intended to be effective at the point of reception are largely improvised. It is suggested by Gould and Sullivan that "definite time limits be set within which it would be mandatory to reduce occupational noise levels to the lowest level technologically feasible."

Advanced techniques of land use have been evolved that, if applied, would control sound during transmission. Community planning can zone areas immediately adjacent to airports and multilane highways for heavy industry, allowing light industry and trading enterprises peripheral to the principal sources of noise. In established communities nothing less than the condemnation and restructuring of large areas would seem to offer much promise of relief when noxious conditions have been permitted to grow.

Leadership and Support

Some administrative achievements are much more intimately bound up with fluctuating boundaries of executive leadership and public support than others. A striking case involves human resources.

It is generally agreed that a long range goal of public policy directed toward the realization of human dignity is the identification and development of human potential. We rely chiefly on the educational system to supplement the family and health institutions in the discovery and cultivation of latent talents.

The shortcomings of American public policy in this area were emphatically shown in World War II. "So many men suffered serious deprivation in childhood and adolescence that 55 Combat divisions with supporting troops were unavailable at a time of national crisis." One man out of every seven called up for military service was rejected or prematurely discharged for mental and emotional deficiencies.

The relative deprivation of a large segment of the population, the blacks, was reflected in the fact that one-third of them (contrasted with 10% of the whites) were rejected for lack of education.

Clark and Plotkin point out that the essential factor in this situation was a segregated school system. Unless schools are integrated American experience confirms the view that the impoverished minority will be exposed to second-class teachers, buildings and other facilities that guarantee second-class educational opportunity.

Stimulated by the *Brown* decision by the Supreme Court in 1954 the U.S. has been in the midst of vast readjustments. Traditional attitudes have mobilized political power to slow down or to reverse the drive toward integration by regressing to the "separate but equal" doctrine of the Court in *Plessy v. Ferguson* (1896).

Clark and Plotkin review the evidence of success or failure on the part of compensatory programs that have been alleged to raise the academic achieve-

ment of black children in segregated schools. While some programs produced small, temporary gains, the results over time betray once again the reality that segregated schools are inherently unequal schools. Incidentally, the evidence shows that black students who attend desegregated schools gain academically, while white children maintain their usual performance.

The critical failure of public policy is formulated by Clark and Plotkin in these terms: "Although less hurt than black children, white children are prevented from full development because neither part of the dual system produces empathic human beings with pride, dignity, and a sense of justice."

The Report also challenges as mislabelling many of the alleged "aptitude" tests currently employed in public or private education. They are "achievement" tests, not measures of potential. Correct labelling would undermine many mistaken ideas.

The dependence of effective administrative action upon leadership and public support is exhibited in almost every sector of environmental policy, whether focussed on the realm of culture or not.

In regard to Space, for instance, Motz focuses on the central issue that has become revitalized in the recent fiscal stringency: shall we go ahead with the penetration of Space or shall we give it up? Motz calls attention to the contribution to the solution of our environmental problems that an active Space program can be expected to make. He cites, for instance, the probable conquest of solar energy, which carries with it the possibility of overcoming the pollution that is associated with the use of fossil fuel.

TERMINATION

In many sectors of environmental policy the U.S. is accustomed to cancel an established set of prescribed practices and to adjust the claims of those who suffer deprivation as a result of changes in a public policy on which they have relied in making previous commitments. The most familiar examples are a by-product of municipal and regional plans that require the expropriation of property for a new public use.

The ideology of progress has been utilized for many decades by politicians, real estate, and innumerable other interests to put into effect a wide variety of changes in land and other resource uses. The usual strategy has been to provide for money compensation to those whose lives are interfered with. In today's world another set of values strengthens the demand of many members of the community to block specific programs of change, to adapt them to claims of cultural identity, or to require equivalent opportunities in exchange for abandonment of a former situation.

The designers of urban or mixed urban-rural environments are especially aware of the adjustments required. At the local level the political mobilization of the poor and of minority groups is making it customary to involve local leaders and professionals in joint activities at every stage of the process. As a result many old edifices, neighborhood gathering places and landmarks are preserved or integrated in the new plans. Individuals, families or whole groups of neighbors may be offered equivalent accommodations if they are required to give up their quarters. Identity demands are affecting many of

the preventive and reconstructive measures that follow in the wake of environmental disasters, such as the abandonment of flatlands subject to flood.

A relatively new note of concern for the identity of the North American Indian has found expression. The Alaska Native Claims Settlement Act (1971) is an example of public policy on behalf of a more complex social objective than was usual in the past. A joint State-Federal Land Use Planning Commission has special responsibilities toward minority interests.

Environmental and native claims are involved in connection with many desert problems. Coal is being stripped from the Black Mesa in the Navajo country and burned in near-by power plants. Environmentalists protest the large volumes of oxides of nitrogen and sulphur dioxide that are spewed into the air.

American private interests and environmentalists have been shocked in different ways as they become involved with the identity consciousness of the developing peoples. The transnational corporation is chiefly affected by the attempts of "ex-colonial" states to regain control of national resources and increase their share of the "take". Environmentalists are less exercised about changing price and profit levels than they are startled by the unwillingness of so many political leaders in the underdeveloped areas to concern themselves seriously with precautionary strategies of environmental protection. In the rhetoric of the battle the environmentalists are seen as innocent stooges of the imperialistic powers who have always joined in preventing the non-industrial peoples from exploiting their own resources for their own advantage.

Considerations of identity appear in several comparatively novel ways. For instance, U.S. policy is to encourage the adoption of measures that enable nations and civilizations to maintain such significant emblems of their identity as sacred places, edifices and art treasures.

It is sometimes predicted that the "craze for science-based technology" will die down as world leaders become better acquainted with the consequences of uncontrolled development. To the extent that selective development becomes an effective force in world affairs the adjustments called for in connection with change will increase the costs and slow down the speed of policy termination.

APPRAISAL

Concern with environmental policy has led to an explosive increase in the number of contradictory assertions about the impact of public policy toward environment. Simultaneously there has been a promising increase in the number of competent scientists who do what they can to deflate exaggerated judgment by putting the accent on the foundations of rational inference about policy and environment. They state assumptions, evaluate the quality, quantity and relevance of available data, and emphasize the importance of continuity and feedback in improving future judgments.

Appraisal differs from planning in that it stresses the current or recent past rather than the future. Appraisals are complicated by the fact that they deal with causal interdependencies, and try to isolate the role that is taken by acts

of policy in environmental deterioration or protection. An ever-present difficulty is the politically "sensitive" character of an appraisal. Evaluations of success or failure are no trivial matter from the viewpoint of a responsible official or agency. Often a scientist is unaccustomed to cook in the kitchen of public controversy and finds it difficult to stand the heat.

Governmental and private commissions have contributed to the material on which the present appraisals are based, and many of their results receive close attention in the appropriate chapter. At this point we single out for special mention the proposals by Emily Mudd, John Norton Moore, and Robert Cancro in the Report on Population, Health and Family. They are concerned with procedures of appraisal in both governmental and private sectors, and undertake to link all sources of data and interpretation, including future oriented programs. After planners make the first wave of estimates of how programs will work out, the study of results become part of the feedback used for appraisal purposes.

The Working Group on Population, Health, and Family at the 1970 Conference formulated a "biological bill of rights" to serve as a long run guide to public policy. "The challenge for man is to develop and implement strategies that will optimize the quality of life rather than enabling mere marginal survival." Lappé in his Report on Human Genetics carries the discussion further by stating a set of questions to be considered and resolved before public policy crystallizes on measures designed to put genetic criteria into effective practice.

The Population Panel now welcomes the recent report of the "Commission on Population Growth and the American Future" as evidence of a shift away from the traditional confusion between population growth and progress. The new viewpoint will remain relatively vague and non-operational unless it is sustained by a "comprehensive network of institutions." A high priority item is the establishment of agencies, such as The National Institute of Population Sciences within The National Institute of Health, as recommended by the Commission. It is also proposed to "establish a *comprehensive continuing task force at the national level* to make recommendations on national health problems and strategies for their amelioration."

In the same integrative vein they assert that it would be valuable to form "*an interdisciplinary center dedicated to the psychosocial consequences of population policy.*" Bearing the problems of interdependence and independence in mind, they propose that five groups would be represented: disciplinary skill groups from social, psychological, medical, and other relevant fields; "nonprofessional" consumers; designers of urban and other environments; the "political community"; computer scientists. The interdisciplinary center might well collaborate with the International Council of Scientific Unions and other concerned associations.

A notable example of innovation in the public policy field has been the liberalization of abortion laws. Gradually the ambivalence in the U.S. will be overcome which will make possible free abortion service as part of compre-

hensive health maintenance programs. The January (1973) decision of the Supreme Court is a major step in this direction.

It is recognized that private and public conflict reflects the changing role of the family in American life. Most conspicuous in this connection has been the women's rights movement and experimentation in the organization of intimacy. It is beginning to be understood that adult needs are to be distinguished from the child rearing function.

Some of the most searching appraisals of policy and environment call attention to fundamental features of the principal institutions constituting the public order of the U.S. and other countries. Recent controversy has thrown grave doubt on the rhetoric of mutual denigration of "socialist" by "capitalist" spokesmen, and *vice versa*. Obviously environmental damage is no respecter of economic systems. Analysis suggests that environmental damage is a consequence of perspectives and operational dispositions that cut across institutional systems and may or may not be important at any particular stage of their evolution.

What are these propensities to damage the environment? Clearly they include an ideology that demands rapid growth in the application of capital-intensive technology and induces impatience with attempts to foresee and to obviate deleterious environmental impacts. The great organizational hierarchies of socialist or capital governments, or of huge private corporations, may be equally oblivious to the environmental consequences of what they do. We noted earlier that *the demand for national and cultural identity* may induce either socialist or non-socialist regimes to favor unregulated growth as a matter of new-found self-respect.

Every political, economic and social system needs a self-appraisal function that mirrors the probable consequences of environmental damage and helps to prepare the minds of leaders and led to *entertain realistic expectations about the consequences of change*.

When the U.S. system is examined to discover the institutional practices that contribute to environmental deterioration, several established policies come prominently into view. We referred before to challenges of the system of taxation, and of many established doctrines and procedures of the legal system.

INTELLIGENCE: UNIFYING IMAGES

Scientists and engineers exercise a long term basic impact on public life by their modes of organizing knowledge about the environment. The scientific community provides many of the images in terms of which public news and opinion are presented and formulated.

Consider, for instance, some of the "special regions" that are gradually attaining the status of public images. The layman never put "marshes and estuaries" together in a coherent image until the intellectual task was performed for him. Similarly, "static and dynamic structures" are never perceived as a whole until designers or engineers provide a conceptual entity.

The task of forming an inclusive image of reality as a pre-condition of clarified public policy is exemplified in Richmond's treatment of Land Ani-

imals. He provides a map of policy alternatives and relates them to representative categories of fauna. He insists on the importance of a program conceived on an international scale that would provide a sound research basis for programs around which public demands could crystallize in support of international, national, sub-national action.

Our policy outlook is stable on some matters of *preservation* or *exploitation*. We experience "no conflict" regarding the preservation of some endangered species in zoos, or the exploitation of domestic animals for consumption purposes. Public tension and conflict are most apparent on questions of *conservation* which is the long range adjustment of the desire to preserve with desires to exploit. Seen in comprehensive perspective public policies toward wildlife conservation are inadequately formulated as accepted goals, prescribed policies, and administered programs.

The tempo of public demand and official action must increase rapidly if we are to cope with the mounting of wildlife crises produced by accelerated interaction and habitat-destruction as a by-product of development. The deliberate pace of international agreement is illustrated by the Paris Convention of 1902 which provided protection for migratory birds useful to agriculture. Conceived in 1886 the treaty became a reality after a gestation period of 34 years. Some recent momentum has been given to conservation matters by the Stockholm Conference and the Technical Meeting of the International Union for Conservation of Nature and Natural Resources (Banff, Canada, 1972).

The difficult task is to tilt the scale in favor of a conservation effort rather than preservation. Land animal policy would appear to be another environmental sector in which scientists must keep the initiative in providing a workable map of what is to be done, and in reaching out into the community to obtain the assets required to keep collective movements alive. As Richmond puts it, "we need to make a concerted effort to gain financial support that can be converted into research and education into a world recognition of the problem, models and case histories of corrective management efforts, realistic assessment of the endangered species' survival potential under man-made optimal conditions and finally international cooperation in identifying suitable habitat and refugia for the animals likely to be displaced."

Basic Knowledge

In the perspective of society as a whole basic scientific knowledge is part of the latent intelligence available to public and private decision makers. Progress in coping with some sectors of the environment seems peculiarly dependent either on fundamental innovations that transform the map of knowledge, or on incremental additions fed from many sources.

Consider public policy toward minerals from this point of view. Austin reminds us of the fundamental goal that was formulated by the Working Group on Cultivating Resources (WAAS Conference, 1970); "The establishment, on a global basis, of a steady-state ecology approximating a closed cycle for all-resources consumed, that is, for all products, waste products and pollutants." Most metal industries have long recycled large amounts of

scrap. However, the realization of the goal is still "far off". The collection of scrap and wastes of various kinds must be better organized and more closely controlled "so that segregation by chemical composition can be improved." New production processes must be developed that "can operate on a larger proportion of scrap in their charge. These and all related measures would seem to imply (1) more expensive operations, and (2) significantly increased demand for power."

In another sector of the environment concern for the seabed has been enormously and suddenly intensified by the assertion that it is an unexploited source of fabulous riches. Emery, Fye and Cadwalader devote their report to a systematic effect to confront these "fantasies" with a cold bath of much more modest forecasts. They believe that the coming Conference is in danger of becoming a battleground and a source of friction between developed and developing countries.

Many fundamental opportunities remain to be seized. Up to the present the significance of the forests for scientific, hence ultimately of policy relevant knowledge, has been slighted. The natural forest is a means of illuminating the processes of natural ecosystems.

Inclusive Monitoring

Basic research is perpetually interactive with inclusive monitoring of the advancing edge of events in every environmental sector. Inclusive monitoring is essential to public policy operations which are necessarily oriented in space and time. The imaginative symbol "Earthwatch" indicates what is implied.

A striking example of a research opportunity is weather forecasting. A liaison is needed between depth research and inclusive monitoring. The scope of fundamental policy toward weather modification has recently broadened, and programs of research have become more closely related to the work of agencies charged with a relevant public purpose. For instance, the Commerce Department is doing research on the reduction of hurricane winds, and Transportation focuses on improving visibility in fogs. However, Sewell points out that the present structural set-up provides no means of evaluating in social terms the research that has been done, or of ranking priorities for future study.

Legislative action is essential to overcome the confusions fostered by erratic application by the courts of traditional legal doctrines concerning damages that result from weather modification. The principles and procedures appropriate to the settlement of inter-state and international controversies are in doubt.

Despite the steps recently taken *no agency at the Federal level is charged with the responsibility for viewing the vast field of weather modification as a whole and formulating or coordinating public policy.* We accept while deploring the truth of the prediction that "it may require a major disaster caused by a weather modification program or project before the necessary adjustments are made in laws, agency structures and policies."

The importance of utilizing inclusive monitoring for the benefit of *both* the aggregate and the individual decision makes is clear in reference to

earthquakes. Kisslinger and Algermissen point to the need of an *"extended effort to produce improved assessments of the risks"* of earthquake damage *"in sufficient geographic detail to be useful to the individual property owner and insuring agencies."* Local jurisdictions need to be advised of the principles of *precautionary land use* and of sound *construction codes*.

Systematic Planning

The intelligence function includes systematic planning. Five intellectual tasks are to be performed: 1. goal clarification, 2. trend description, 3. analysis of conditions, 4. projection of inclusive futures, 5. invention, evaluation and recommendation of alternatives. The vast amount of information required can only now be processed within time limits that provide genuine assistance to decision makers. Simulation by computer is increasingly commonplace on environmental matters. It is now possible to present alternatives at the focus of attention of decision makers in ways that draw on their total stock of predispositions and challenge their capacity for reflection.

Langbein suggests that Congressional reluctance to adopt a unified water policy probably reflected *"the diversities of the occurrence of water, the diverse and changing objectives, and the diverse clients to be served,"* but also expressed a deep preference for a flexible ad hoc approach that appears to have *"merits grounded in experience."*

The lower Potomac is a case in point. Navigation was the principal concern of public policy in the early nineteenth century. This was followed through the years by preoccupation with hydropower, water supply, flood control, quality of water, maintenance of the landscape, and the aesthetics of the riverscape.

Given the shift in the scope of planning from single to multiple purpose and multimethod, a new conception of policy formation and execution has been taking shape. *A "systems analysis" approach is being used to set up 'alternative plans that optimize on each objective' and submit them for public review and choice in the political arena.* The idea is to use benefit-cost analysis to illuminate the net economic benefits gained or lost through optimizing one objective against another.

That we cannot depend on simple familiarity with a part of the environment or on sophisticated machinery to guide public planning is particularly evident in the sector of food policy. The first task is to *"put it all together"* in a potential program that makes sense. Among the reports in the present volume Borgstrom's is one of the most challenging.

Approaching the public policy toward food Borgstrom reminds us of certain basic assumptions: the world in the 70's is adding almost 1000 million people; 600 million are heading for cities; the southern flank of the Western Hemisphere is growing most rapidly in the world and will approach 700 million by 2000 A.D.

It is recommended that we change current policy thinking in fundamental ways. Borgstrom points to neglect of the role of food in water pollution. Water resources are increasingly overtaxed by the massive sewage loads ejected from our cities. The food in the sewage reacts in the same way that

fertilizer does in the field, and adds toxic and other deleterious consequences to pollution. The demand for animal proteins has vastly enlarged animal production, and this in turn has exaggerated the pressure on plant production. Our plant raising technology calls for more fertilizers which contribute to dangerous waste. The intake of animal protein in the U. S. excels that of every country in the world save New Zealand. At the same time the lower income members of the nation cannot consume beef or other animal proteins and often have an excessive calorie intake. If U. S. food policy is to improve the diet of the poorer members of the nation, and also to help meet the needs of the hungrier world, *a key strategy must be to increase the production of plant protein*. Cheaper foods must be channelled into the market such as enriched bread or biscuits or pizzas, utilizing proteins from soybeans, sunflower, and cottonseed. Attractive new foods can be based on oilseed proteins.

It is proposed to create *a World Bank operating with protein as its prime currency*. Grain protein, concentrated and oilseed proteins would become essential monies whose importance for public health, education and employment would be kept at the focus of attention.

Plant protein production by microorganic means has not been encouraged in a systematic way. Researchable alternatives include the use of nitrogen-fixing blue-green algae, lignin-decomposing fungal gardening, based on wood chips and other wood waste, and the conversion of sewage plants into food or fuel producing centers.

We need to monitor the use of additives in food. "Advances made in food processing (canning, freezing, refrigeration, dehydration etc.) in the Western world since the turn of the century have drastically reduced the load of chemicals in food." Monitoring could be used to educate the nation about past trends and remaining dangers and guide support to changes compatible with health.

More public action is required in reducing the role of the food industry in pollution, which actually accounts for half of our total industrial pollution (in the form of packaging).

It is evident that city planning and urbanization policies must begin to think in fundamental terms of the interplay between food and environment.

Public Information

While it is commonplace to advocate free and adequate public information on all aspects of public policy, environmental policy included, we cannot truthfully report that the criteria of adequacy have been formulated by public or private agencies.

A basic principle and a fundamental procedure was articulated in the Freedom of Information Act [(1966), Amended 1967]. The public's right to know was to be respected by providing access to all federal documents not specifically exempted by the Act from disclosure. When challenged the burden of proof for withholding information rests with the agency. It is widely believed by knowledgeable people that the Act is poorly or erratically enforced. The National Environmental Policy Act (1970) has in a degree

aided the public in obtaining access to information on the environmental impact of any project that requires a federal license or funding. Some agencies remain recalcitrant and the executive should order them to comply.

Rubin and his colleagues point out that the private business community is relatively untouched by the freedom of information movement. The press and other private agencies must work through regulative commissions to obtain information of plans that affect natural resources, and these plans are often hedged about with traditional arrangements to enforce secrecy. Corporations have such huge resource bases under their control that absence of information leaves the public in the dark on matters of great common importance. Information difficulties are multiplied because of the "increasingly blurry line between public and private decision-making." "Land developers, construction firms and the financiers of urban growth have become adept at manipulating the policy decisions of government in order to maximize private advantage from the availability of electric power, transportation, water and tax shelters."

Rubin and his colleagues assert that, if access is to be provided, concerned private individuals and associations must be made aware of the numerous statutes that prescribe information disclosure. Moreover, *the delicate question should be faced, presumably by a public investigation, of how private business sources can be covered without losing the advantage of a "mixed" economy.*

Besides access to information communication policy includes effective dissemination and use of information to which access is obtained. The public policy embodied in the First Amendment assumes that a free press will be an adequate reporter and interpreter of policy-relevant information. The media have in fact been an indispensable means of arousing public *awareness* of environmental problems. Prior to mid-1969 stories of environmental deterioration were relatively rare. The pre-conditions were present of public attention and concern. Americans who had fled the great urban centers found that the familiar problems of congestion, pollution and the related syndrome of threats were not left behind them. Latent interest exploded into vivid and sustained coverage with the Santa Barbara oil spill, an air inversion over New York, and other dramatic incidents. Politicians perceived that the environmental control issue was good politics.

The news media have expedited *awareness* of the problems involved without, however, providing an adequate follow-through in terms of *understanding*. The possibility in the next 15 years of a nation wired by coaxial cable with a two-way capacity promises to improve the level of public knowledge of environmental problems. The "Home Information Outlet" will permit individuals to command computer-stored information *when they want it*. Public knowledge will in theory be limited by the depth of current and archival information stored in a central computer (to which home terminals are linked), rather than by the most recent editorial decisions of newspaper editors and broadcasters. More specifically, a future subscriber could have at his fingertips: 1. a complete index of library information on

any given environmental subject, with complete lists of books and articles, if desired; 2. a listing of pending government decisions, bills, and meetings; 3. background or interpretative information on any breaking news event; 4. the ability to monitor any important public meeting on a home television screen; 5. consumer information to permit environmentally informed purchasing; 6. the ability to register an opinion instantly on local or national referenda.

The private media can take it upon themselves to act as "an early warning system" for the public on environmental matters. This calls for maintaining contact with the best informed sources in the academic and non-academic, governmental and private sectors of society.

PROMOTION

Promotional activities urge a single solution to public problems. For this reason scientists are typically unwilling to step into the center of the political arena and engage in the persistent and usually exaggerated propaganda campaigns that mobilize intense demand for specific action. In recent times scientists, journalists, officials, lawyers and political leaders have moved in and out of coalitions whose programs ranged from broadcasting alarmed concern for environmental damage to the advocacy of specific acts. If Environmental issues are to remain practical politics, a network of promotional organizations must continue to mediate between the complexities of scientific knowledge and the uncertainties of taking particular steps into the future. It was the unparalleled outpouring of devoted interest in the politics of the environment that upgraded the priorities of environmental policies in recent years.

The success or failure of campaigns to mobilize public demand for official action toward environment depends on the degree of involvement of individuals and organizations with their surroundings. In some instances the relationship of people to environment seems almost "too close". If familiarity does not breed contempt it at least stifles initiative on behalf of critical and well-articulated objectives.

Inland water is a case in point. Water impinges on everybody's attention and great concern can be aroused in time of flood or a sudden increase in foul-tasting water. Despite all this it cannot be truthfully said that a coherent conception of public policy toward inland water is widely shared.

It cannot be denied that the weather is a persisting public interest; nonetheless, very little informed public pressure has been mobilized behind proposals for a unified public policy. Should the weather broadcasters bring these matters to the notice of the listening-viewing audience?

The public policies that affect marine life are of immediate and recognized interest to the fishing industry and experts on marine biology. The community at large is involved more episodically and principally as a consumer, or would-be consumer, of fish. As a result of this structure of attention the goals and agencies of public policy have been, and continue to be, of urgent concern to discernible minorities, while arousing more tepid and marginal interest in the larger continental countries.

As Herrington and other specialists remark an essential problem is to obtain voluntary support and conformity by the fisheries or they will in fact continue the mentality of "hunters" who raid and destroy. These must be confidence that present abstinence will pay off in future opportunities (and non-conformers, especially foreign competitors) will be restrained. Obviously combined international and national action is required. *The coming Conference is a critical opportunity if it is part of a continuing program.*

However ephemeral or enduring the impact of the Stockholm Conference may prove to be, it can be endorsed as an unparalleled success in the promotion of environmental awareness at many levels and locations throughout the world community. Margaret Mead summed up the long-term significance of what is happening as a "revolution in thought fully comparable to the Copernican revolution by which, four centuries ago, men were compelled to revise their whole sense of the earth's place in the cosmos. Today we are challenged to recognize as great a change in our concept of man's place in the biosphere."

Decision structures in the United States and elsewhere have been modified to improve the performance of every function, whether prescription or invocation, application or termination, appraisal or intelligence, or promotion.

The question of most direct concern to us is whether the scientific community will continue to play an influential part in policy formation and execution. Will individual scientists and professional organizations of science lose interest and fade out of the picture, or will they stabilize a permanent role in cooperation with private citizens and public officials in the policy process affecting the realms of earth and space, life, and culture?

We have reiterated the importance of *continuity* in the future relations between science, scientists and society. In our analysis of the several components of decision we have called attention to the distinctive contribution that knowledgeable persons can make to both intelligence and appraisal. The present undertaking, it should be noted once more, is an outgrowth of the International Conference conducted jointly in 1970 by the American Division of The World Academy of Art and Science and The American Geographical Society. A continuing committee was authorized to plan and execute a follow-up on the theme of the Conference, "Environment and Society in Transition." One result is *Public Policy Toward Environment 1793: A Review and Appraisal* carried out with the cooperation of The New York Academy of Sciences.

The next major step in the continuation program is another International Conference to be held at The New York Academy of Sciences during the week of April 22, 1974. The Organization Committee for this conference is composed of Dr. Detlev W. Bronk, Dr. Serge Korff, Dr. Harold D. Lasswell, Dr. John McHale, Dr. Lloyd Motz, Dr. Stuart Mudd and Dr. Boris Pregel. At that time it will be possible to revise the statements of goal and principle that were formulated by the working groups at the 1970 Conference. Critical attention will be given to the principal pre-views of the future ranging from

forecasts of doom to scenarios of hope. Appropriate strategies will be generated and evaluated in the light of accumulated knowledge.*

SUMMARY

Public Policy Toward Environment 1793: A Review and Appraisal was prepared under the auspices of The American Section, World Academy of Art and Science, and The New York Academy of Sciences. It is an outgrowth of an International Conference on "Environment and Society in Transition" held on the premises of The New York Academy of Sciences April 27-May 2, 1970, whose principle papers, discussions and resolutions are published as volume 184 of The New York Academy (1971).

The object of the Appraisal is to judge how far we have come in formulating and executing public policy toward environment in the recent past, and to make it easier to discover priorities of goal and strategy in the immediate future. The *Review and Appraisal* is composed of twenty short chapters prepared by individual experts or panels of experts on various sectors of the environment. A general summation is made in the final chapter.

The Environment is divided into three realms for purposes of science and policy. It is evident that astronomy and geology are oriented toward space and earth. The biological and medical sciences focus on life. Anthropology, economics, political science, law and the other social sciences are specialized to culture.

The most comprehensive generalization about recent public policy toward environment is that more progress has been made in recent years than at any time in the history of the nation in the formation and execution of policy at every level; international, national, sub-national. Viewing the scene as a whole, however, we conclude that a wide gap separates the long-term goals outlined in the Conference of 1970 and the present state of the environment.

A pre-condition of more effective future action is that we become more aware of and concerned with improving the policy process as a whole. Therefore the Appraisal pays particular attention to whatever progress has been made in seven components of the decision process: prescription, invocation, application, termination, appraisal, intelligence, promotion.

In view of the disorganized and fragmented character of U. S. policy in several sectors of environmental policy the panels of experts urge the appointment of national policy commissions to make comprehensive recommendations, notably in reference to *energy*, *education*, and *population*. Specific proposals for official or private action are made in the twenty fields dealt with by the panels.

* At the International Joint Conference of the American Geographical Society and the American Division of the World Academy of Art and Science, April 27-May 2, 1970, the members of the Working Group on Decision Processes included Myers S. McDougal, George E. G. Catlin, Yehezkel Dror, Philip C. Jessup, Otto Klineberg, Ervand Kogbetliantz, Harold D. Lasswell, Maurice Marois, Oscar Schacter, Burns Weston, and Francis Wolf. In addition to the writers of the various Reviews and Appraisals the assistance of a number of specialists on several points is gratefully acknowledged, among whom we mention only Jan Schneider, Yale Law School; Geoffrey Lanning, Wayne State University; Stuart Nagel, University of Illinois; and Lawrence Hargrove, American Society of International Law.